Current Status of Claims

1.(currently amended)   A method for frame multi-resolution analysis <u>implemented on a</u> <u>computer</u> comprising the steps of:

constructing isotropic, non-separable ideal windows in a dimension greater than ~~or equal to~~ 1~~;~~<u>;</u>

~~constructing translation and dilation operators for~~ <u>translating and dilating</u> the <u>ideal</u> windows <u>using translation and dilation operators</u>;

constructing isotropic, non-separable filters from the ideal windows <u>of the previous step</u>~~, the~~ ~~translation operators and the dilation operators~~, where the filters are selected from the group consisting of isotropic, non-separable low pass filters, isotropic, non-separable high pass filters and isotropic, non-separable filters that cover a desired frequency range or plurality of <u>desired</u> frequency ranges;

constructing isotropic, non-separable <u>frame</u> scaling functions ~~and associated translation~~ ~~operators for use with the isotropic, non-separable scaling functions~~; and

producing associated isotropic, non-separable wavelets from the isotropic, non-separable filters and the isotropic, non-separable scaling functions, where the wavelets and filters are adapted to resolve or decompose ~~a~~ multidimensional signal<u>s, data, information, or images</u> into a plurality of non-overlapping ~~subsets~~ <u>sub-bands corresponding to</u> ~~or~~ resolution levels <u>improving analysis</u> <u>efficiency and improving analysis of more complex multidimensional signals, data, information or</u> <u>images</u>.

2.(previously presented)   The method of claim 1, further comprising the step of:

dividing each filter into at least one relative low pass component and at least one relative high pass components.

3.(currently amended)   The method of claim 1, wherein the multidimensional signal is: a streaming video signal, a seismic imaging signal, a digital medical imaging signal, a satellite imaging signal, a surveillance imaging signal, a target acquisition imaging signal, a radar imaging signal, <u>or</u> a sonar imaging signal, ~~or a pattern recognition imaging signal~~.

1   4.(**currently amended**)   A method for analyzing data <u>implemented on a computer</u> comprising

2   the steps of:

3   constructing at least one isotropic, non-separable wavelet including:

4   isotropic, non-separable filters having at least one ideal isotropic, non-separable

5   window ~~and necessary~~ <u>translated and dilated as necessary using</u> translation and

6   dilation operators, where the filters are selected from the group consisting of

7   <u>isotropic, non-separable</u> low pass ~~isotropic, non-separable~~ filters, <u>isotropic, non-</u>

8   <u>separable</u> high pass ~~isotropic, non-separable~~ filters and isotropic, non-separable filters

9   that cover a desired frequency range or plurality of <u>desired</u> frequency ranges;

10   isotropic <u>frame</u> scaling functions <u>where translations of the frame scaling functions</u>

11   <u>form a frame</u> ~~and associated translation operators for use with the scaling functions~~;

12   and

13   resolving or decomposing ~~a~~ multidimensional signal<u>s, data, information, or images</u> into a

14   plurality of non-overlapping ~~subsets or~~ sub-bands <u>corresponding to</u> resolution levels with the at least

15   one isotropic, non-separable wavelet <u>improving analysis efficiency and improving analysis of more</u>

16   <u>complex multidimensional signals, data, information or images</u>.

1   5.(**previously presented**)   The method of claim 4, further comprising the step of:

2   dividing each isotropic, non-separable filter into at least one relative low pass isotropic, non-

3   separable component and at least one relative high pass isotropic, non-separable components.

1   6.(**previously presented**)   The method of claim 4, wherein the multidimensional signal is: a

2   streaming video signal, a seismic imaging signal, a digital medical imaging signal, a satellite imaging

3   signal, a surveillance imaging signal, a target acquisition imaging signal, a radar imaging signal, a

4   sonar imaging signal, or a pattern recognition imaging signal.

1   7.(**currently amended**)   A system for processing signals implemented on a computer

2   comprising:

3   a processing unit having encoded thereon a completely isotropic, non-separable ideal filter

4 for frame multi-resolution analysis software including:

5   wavelets adapted to resolve a multidimensional signal into various resolution levels,

6   where the wavelets are derived from:

7   isotropic, non-separable ideal windows or filters in a dimension greater than

8   ~~or equal to~~ 1,

9   ~~translation and dilation constructs or operators adapted to form completely~~

10   isotropic, non-separable low pass filters, isotropic, non-separable high pass

11   filters and isotropic, non-separable filters that cover a desired frequency range

12   or plurality of frequency ranges ~~from the isotropic ideal windows into~~; and

13   isotropic, non-separable <u>frame</u> scaling functions <u>where translations of the</u>

14   <u>frame scaling functions form a frame</u> ~~and associated translation operators for~~

15   ~~use with the scaling functions~~;

16 <u>where the system resolves or decomposes multidimensional signals, data, information, or</u>

17 <u>images into a plurality of non-overlapping sub-bands sets or resolution levels with the at least one</u>

18 <u>isotropic, non-separable wavelet improving analysis efficiency and improving analysis of more</u>

19 <u>complex multidimensional signals, data, information or images.</u>

1 **8.(previously presented)** The system of claim 7, wherein each isotropic, non-separable high pass

2 and each isotropic, non-separable low pass filter comprise:

3   at least one isotropic, non-separable relative low pass component and at least one isotropic,

4 non-separable relative high pass component.

1 **9.(previously presented)** The system of claim 8, wherein each isotropic, non-separable relative

2 high pass component and each isotropic, non-separable relative low pass filter comprise:

3   at least one isotropic, non-separable relative low pass subcomponent and at least one

4 isotropic, non-separable relative high pass subcomponent.

1 **10.(previously presented)** The system of claim 7, wherein each isotropic, non-separable high pass

2 and each isotropic, non-separable low pass filter comprise:

3   a plurality of isotropic, non-separable high pass and isotropic, non-separable low pass

4   components, each component including at least one isotropic, non-separable relative low pass

5   subcomponent and at least one isotropic, non-separable relative high pass subcomponent.

1   11.**(previously presented)**   A completely isotropic, intrinsically non-separable low pass filter or

2   high pass filter implemented on a computer comprising:

3   isotropic, non-separable ideal windows in a dimension greater than or equal to 1, and

4   translation and dilation operators adapted to form out of the ideal windows completely

5   isotropic, non-separable low pass filters, isotropic, non-separable high pass filters and isotropic, non-

6   separable filters that cover a desired frequency range or plurality of frequency ranges from the

7   isotropic ideal filters.

1   12.**(previously presented)**   The filter of claim 11, wherein the isotropic, non-separable low pass

2   filter comprises:

3

$$m_0(\xi) = \sqrt{2}\, \chi_{D/\sqrt{2}}(\xi), \; \xi \in \mathbf{T}^2$$

1   13.**(previously presented)**   A completely isotropic, intrinsically non-separable scaling function

2   implemented on a computer comprising:

3

$$\phi = F^{-1}(\chi_D)$$

1   14.**(currently amended)**   An isotropic, non-separable wavelet scaling function implemented on

2   a computer comprising:

3

$$\phi(R) = \frac{J_{n/2}(\pi R)}{(2R)^{n/2}}, \quad R > 0$$

1   15.**(currently amended)**   An isotropic, non-separable wavelet implemented on a computer

2   comprising:

3   at least one isotropic, non-separable filter including at least one isotropic, non-separable ideal

4   window and translation and dilation operators, where the filters are selected from the group

5   consisting of isotropic, non-separable low pass filters, isotropic, non-separable high pass filters and

6   isotropic, non-separable filters that cover a desired frequency range or plurality of frequency ranges;

7   and

8   ~~constructing~~ isotropic <u>frame</u> scaling functions<u>, where translations of the frame scaling</u>

9   <u>functions form a frame</u> ~~and associated translation operators for use with the scaling functions~~.

1   16.(**currently amended**)   The wavelet of claim 15, wherein the wavelet further comprises:

2    $$h_r = e_{q_r} \chi_Q \qquad r \in \left\{ 0,1,\ldots, p-1 \right\}$$

3   where $\left\{ e_{A(k)} h_r : k \in \mathbf{Z}^n, r = 0,1,\ldots,p-1 \right\}$ is $\hat{W}_{-1}$'arseval frame

4    $\left\{ T_{A(k)} F^{-1} h_r : k \in \mathbf{Z}^n, r = 0,1,\ldots,p-1 \right\}$ is a Parseval frame for W_{-1}, $\psi_r = D\hat{J}^{-1}$

5    $\{ T_k \psi_r : k \in Z^n, r = 0, 1,\ldots, p\text{-}1 \}$ is a Parseval frame for W_0, and $\{ \psi_r : r = 0, 1,\ldots, p\text{-}1 \}$ is a Parseval

6   frame multiwavelet set associated with the FMRA $\{ V_j \}_j$.

1   17.(**currently amended**)   The method of claim 1, further comprising the step of<u>:</u>

2   decomposing ~~the~~ <u>a</u> multidimensional signal<u>, data set, information, or image</u> into a plurality

3   of non-overlapping subsets or resolution levels using ~~an equal~~ <u>a</u> plurality of isotropic, non-separable

4   wavelets <u>derived</u> from the isotropic, non-separable filters and the isotropic, non-separable scaling

5   functions.

1   18.(**currently amended**)   The method of claim 17, further comprising the step of:

2   ~~reconstructing~~ <u>forming</u> a reconstructed multidimensional signal<u>, data set, information, or</u>

3   <u>image</u> from the plurality of non-overlapping subsets or resolution levels, where the reconstructed

4   multidimensional signal<u>, data set, information, or image</u> has enhanced boundary properties and has

5   reduced noise.

1   19.(**new**)   The method of claim 1, wherein the number of dimensions is greater than or equal

2   to 2.

1   20.(**new**)   The method of claim 1, wherein the number of dimensions is greater than or equal

2   to 3.

1   21.(new)   The method of claim 4, wherein the number of dimensions is greater than or equal
2   to 2.

1   22.(new)   The method of claim 4, wherein the number of dimensions is greater than or equal
2   to 3.

1   23.(new)   The method of claim 7, wherein the number of dimensions is greater than or equal
2   to 2.

1   24.(new)   The method of claim 7, wherein the number of dimensions is greater than or equal
2   to 3.